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## The Identity of *Ameiva tessellata* Say\*

Hobart M. Smith and W. Leslie Burger

An attempt to determine the exact type locality of *Ameiva tessellata* Say in James (1823a, p. 50) (= *Cnemidophorus tessellatus tessellatus* of recent authors) has led to the conclusion that the name has long been applied incorrectly, and actually refers to the species generally known as *Cnemidophorus grahami* Baird and Girard (1852b, p. 128).<sup>1</sup>

The original description appeared as a footnote by Say in James' account of Long's expedition to the Rocky Mountains (James, 1823a, p. 50-51). James' account was reprinted in a London edition which appeared the same year as the original Philadelphia edition. Changes in the London edition were few and minor, chiefly involving the placement of footnote material in the body of the text. Say's description appeared on pages 238 and 239 of volume 2. Both editions have become relatively rare, but in 1905 Thwaites reprinted the London edition, reverting however to use of footnotes as in the original Philadelphia edition. Thwaites also added rather numerous editorial comments of considerable value.

We have been able to examine only the original Philadelphia and the Thwaites editions. No noteworthy change from the original occurs in the description of Say's species as reprinted in Thwaites (1905, p. 43-44, vol. 16) other than the spelling of the specific name as *tessellata* rather than *tesselata*. The specimens furnishing the basis for Say's description were observed by members of Long's Expedition to the headwaters of the Arkansas River, on July 19, 1820, somewhere in the near vicinity of a creek called Castle Rock Creek by James. This creek, according to Thwaites (1905, p. 44) is now

\*Contribution from the University of Illinois, Department of Zoology and Museum of Natural History, Urbana.

<sup>1</sup>We have been able to complete this study only through the kind assistance of Karl P. Schmidt with the literature, and of Dr. Doris Cochran, Dr. Howard K. Gloyd, and Clifford Pope in providing access to much-needed comparative material.

known as Beaver Creek and is situated in eastern Fremont County in eastern central Colorado. The creek is a tributary of the Arkansas River, and lies well to the east of the Continental Divide. This locality is far from the range of the species which up to the present time has borne the name of *tesselatus*; in fact, that species does not cross the Continental Divide nor even very closely approach it from the west anywhere north of southern New Mexico (see Smith, 1946, map 35, p. 508). The expedition whose members observed the type specimens at no time crossed the divide, but remained eastward throughout its duration. Thus there is apparently no chance whatever that more westerly specimens could have been observed or captured by the expedition. While the range of *C. t. tessellatus* (auct.) is not thoroughly known, there is no indication whatever that any population belonging to it could exist, now or then, in the area of the type locality of *A. tessellata*.

The original description of Say's species follows:

"[July] 19th. [1820] This morning we turned our backs upon the mountains, and began to move down the Arkansa. It was not without a feeling of regret, that we found our long contemplated visit to these grand and interesting objects, was now at an end. More than one thousand miles of dreary and monotonous plain lay between us and the enjoyments and indulgences of civilized countries. This we were to traverse in the heat of summer, but the scarcity of game about the mountains rendered our immediate departure necessary.

"A large and beautiful animal\* of the lizard kind (be- [p. 51] longing to the Genus Ameiva,) was noticed in this day's ride. It very much resembles the Lacerta Ameiva, as figured and described by Lacepede, but the tail is proportionably much longer. Its movements were so extremely rapid that

"\*Genus Ameiva.—*A. tessellata*. Say. Tesselated lizard.—The back and sides of the body and neck, are marked by nine or ten longitudinal lines, and eighteen or twenty transverse ones, dividing the whole surface in a tessellated manner, the interstitial quadrate spaces being black; these lines are light brown on the back, and assume a yellow tint on the sides; the scales of these portions of the body are very small, convex and rounded.

"The top of the head is olivaceous, covered by plates, arranged thus: [p. 51] 2 with an intermediate small one at their tips; 1, 2, 1 the largest, 2, and 3, superior orbits of the eyes with four plates, of which the two intermediate ones are much the largest; belly bluish-white; throat and neck tinged with yellow, and covered with somewhat larger scales than those of the back; anterior feet yellowish within, and covered with minute scales, on the exterior and posterior sides greenish-white with confluent black spots and large scales; posterior feet behind greenish-white, with confluent black spots and minute scales, the anterior side yellowish covered with large scales; pores of the thigh very distinct and promi-

it was with much difficulty we were able to capture a few of them. . . [Description of country follows here.] . . . [p. 52].

"A little before noon, we crossed a small stream, which was called Castle Rock creek from a remarkable pile of naked rocks, and halted for dinner on the bank of the river."t

Most of the preceding description could fit specimens of either *tesselatus* (*auct.*) or *grahami*, the only forms potentially occurring in the indicated area and to which the description conceivably could apply. At least three characters, however, point toward *grahami*: (1) the bluish-white belly in conjunction with the peculiar dorsal pattern, (2) the "18 or 20 transverse lines," and (3) the "few lines of black spots near the base" of the tail.

Unfortunately, so far as ease of identification is concerned, some southeastern specimens of *C. tessellatus* (*auct.*) from New Mexico and Texas as well as specimens from certain other widely remote sectors, possess a dorsal pattern closely paralleling that of *C. grahami*; rarely the similarity is virtually exact, so that reliable identification by that means alone is impossible. However, this fact should not be permitted to detract from appreciation of the very great value of the dorsal pattern as an identifying characteristic of *C. grahami*. So far as comparison with the original description of *A. tessellata* is concerned, this apparent fact is important: those specimens of *C. tessellatus* (*auct.*) with a bold dorsal pattern resembling that of *C. grahami* almost always possess more numerous dark spots, either well-defined or diffuse, on the chest and, especially significantly, the throat. In *C. grahami* the ventral surface of the throat is unspotted, "immaculate" in the words of Say, except in occasional specimens which have two or three small distinct dark spots placed irregularly. The chest and abdomen are in some specimens immaculate, but more often are flecked with black in *C. grahami*, although the extent of marking averages less than in similarly marked *C. tessellatus* (*auct.*). Apparently nowhere in its range does the latter species exactly match the combination of the "yellowish-white, immaculate" venter and the checkered dorsal pattern of *C. grahami*, and of Say's description of *A. tessellata*.

The number of transverse light lines (18 or 20) mentioned by Say for *tesselata* is characteristic of *C. grahami*, but not of most *C. tessellata* (*auct.*), which more often have 24 to 30. None have been observed with so few transverse lines as 20.

The "lines of black spots near the base" of the tail commonly occur in *C. grahami*, seldom in *C. tessellatus* (*auct.*) in the eastern part of its range.

tThwaites (1905, p. 44, vol. 16) states that "The distance travelled since leaving Royal Gorge indicates Beaver Creek, in eastern Fremont County, as probably the one here called Castle Rock Creek."

In addition to these three pattern characters, geographic probability very strongly favors conspecificity of *A. tessellata* Say and *C. grahami*, inasmuch as the latter is known to be widely distributed east of the Rocky Mountains, north at least to the central panhandle of Texas. It is true that the species has never been recorded elsewhere for Colorado, but its occurrence there is not an unreasonable possibility on grounds of biotic areas. The canyon habitat indicated by James likewise corresponds with the known preferences of *grahami*, notoriously a canyon, as opposed to plains, inhabitant.

Furthermore, if perchance the date of observation was incorrectly recorded, the itinerary of Long's party led only through areas known to be inhabited by *C. grahami*, never through the known range of *C. tessellatus* (auct.). The expedition's route crossed the middle of the Texas panhandle, following the south fork of the Canadian River. It is entirely possible that the party observed the specimens of *A. tessellata* in this panhandle area, where *C. grahami* is well known, rather than in Colorado. Thus even if the date were erroneously recorded, the possibility that *C. tessellatus* (auct.) was involved is still remote and virtually nonexistent.

The exact status of the species formerly called *Cnemidophorus grahami* Baird and Girard is of considerable importance inasmuch as: (1) if it is identical with *C. tessellatus* (auct.) as Burt (1931) believed, no change whatever in nomenclature is required; (2) if it is a subspecies of *tessellatus* (auct.), then only its name and that of *C. t. tessellatus* (auct.) will require a change; and (3) if it is a distinct species, rather extensive changes in nomenclature will result, for the name *tessellatus* will be removed completely from the species to which it has formerly been applied.

The problem of the status of the species *C. grahami* (auct.) has accordingly been reviewed again on the basis of literature and specimens locally available. While not numerous, the specimens examined do rather forcefully bear out the opinions of Strecker (1910, p. 8-13, pl. 1; 1915, p. 25), Van Denburgh (1924, p. 213), and Schmidt and Smith (1944, p. 85) that not one but two distinct species, *C. grahami* and *C. tessellatus* (auct.), are involved. An apparently infallible distinction can be made on the basis of the dorsal pattern and mesoptychial scales. The pattern is of a bold, black-and-white, checkered effect, and the mesoptychial scales unmistakably large, in *C. grahami*; the mesoptychial scales are always small in *C. tessellatus*, and the dorsal pattern seldom like that of the former, characteristically rather faded, more reticulate, of finer dark lines, and with a stronger tendency toward formation of transverse bars or longitudinal lines, without the balance of both tendencies necessary to produce a prominent checkered appearance. Plates 117 and 118 in

\*A. Chicago Academy of Sciences. UINMH—University of Illinois Museum of Natural History. CNHM—Chicago Natural History Museum.

with the exception of figure c, plate 117 which is a ventral view of a specimen of *C. tessellatus* (auct.).

Another apparently infallible difference between the two species concerns the size of the extreme anterior gular scales; they are very minute—as small as the smallest gulars in front of the mesoptychials—in *C. grahami*, but distinctly larger than the smallest gulars bordering the mesoptychials in *C. tessellatus* (auct.).

The difference in coarseness of the dorsal pattern has been mentioned previously; counts upon series from sufficiently widely representative localities are not, however, available at the present time.

While the similarities between these two species are remarkable, the differences are inescapable and we believe unquestionably of specific, not sub-specific, implication. The two species might well be regarded "sibling" species in the terminology of Mayr (1942, p. 151). As a final and perhaps clinching point in support of specific distinctness of the two forms, it is noteworthy that both occur together certainly in some and no doubt in many restricted areas; specimens of both are at hand from El Paso, Texas, and Van Denburgh loc. cit.) records both from Las Cruces, New Mexico. Schmidt and Smith (1944, p. 85) likewise note the occurrence of both forms—in ecologically distinct zones, however—in the Chisos Mountain area of Brewster County, Texas. Of course the gross ranges of the two species have long been known to overlap very extensively in southwestern Texas and southeastern New Mexico.

Specimens examined from the critical area of range overlap are as follows.\*

*C. t. tessellatus* (auct.):

Brewster Co., Texas—Crooked Hills, 12 mi. e. of Chisos Mts., CA 4848-50; Boquillas, CA 4851-2; Hot Springs, CA 11516-9; Tornillo Flats, in Chisos Mts., CA 4841-2; Burnham Ranch, in Chisos Mts., CA 11515; Indian Peak, in Chisos Mts., CA 4843-7. Valverde Co., Texas—Langtry, CA 11513-4. El Paso Co., Texas—El Paso, UIMNH 1532. Santa Fe Co., New Mexico—Santa Fe, UIMNH 1533.

*C. grahami* (auct.):

Presidio Co., Texas—Provenir, CNHM 46033-5. El Paso Co., Texas—El Paso, CNHM 29453-6. Otero Co., New Mexico—Tularosa, CNHM 2945-6.

That the name *C. grahami* has been correctly allocated in the past has been verified by examination of the cotypes, now U. S. National Museum 3096a-b. We hereby designate Number 3096a lectotype; it has 20-20 femoral pores and 216 dorsal scales from the posterior margin of the interparietal to

a line even with the posterior margins of the thighs; number 3096b has 214 dorsals, similarly counted. In both specimens distinct black markings are present on the anterior edges of the lateral ventrals; faint markings are present on the lower surface of the forelegs; chin and ventral surface of hind legs immaculate white. In the lectotype specimen there are 7 rows of regular, quadrangular spots, 18 from ear to thigh. In the paratype the rows are united to form crossbars, many of which cross one-half or more of the back; 19 bars from ear to thigh; 5 light stripes discernible medially.

As stated previously, the admission of (1) conspecificity of *Ameiva tessellata* Say with *Cnemidophorus grahami* Baird and Girard, and (2) the specific distinctness, from other named relatives, of the single species to which both of these names are applicable, most unfortunately requires rather extensive revision of present nomenclature in this group. The revision cannot be avoided on nomenclatural grounds since only zoological considerations are involved. The changes are as follows:

*Cnemidophorus tessellatus* (Say, 1823, p. 50-51) supersedes *grahami* Baird and Girard (1852b, p. 128).

*Cnemidophorus tigris tigris* Baird and Girard (1852a, p. 69\*) replaces *C. tessellatus tessellatus* (auct.; e. g., Smith, 1946, p. 421-424, pl. 118).

*Cnemidophorus tigris aethiops* Cope (1900, p. 582-584) replaces *C. tessellatus aethiops* (auct.; e. g., Smith, 1946, p. 424-426, pl. 119).

*Cnemidophorus tigris canus* Van Denburgh and Slevin (1921, p. 97) replaces *C. tessellatus canus* (auct.; e. g., Burt, 1931, p. 208-211).

*Cnemidophorus tigris celeripes* Dickerson (1919, p. 472) replaces *C. tessellatus celeripes* (auct.; e. g., Burt, 1931, p. 202-205).

*Cnemidophorus tigris martyris* Stejneger (1891, p. 407) replaces *C. tessellatus martyris* (auct.; e. g., Burt, 1931, p. 205-208).

*Cnemidophorus tigris rubidus* Cope (1892, p. 36, pl. 12, fig. 1) replaces *C. tessellatus rubidus* (auct.; e. g., Burt, 1931, p. 199-202).

*Cnemidophorus tigris stejnegeri* Van Denburgh (1894, p. 300) replaces *C. tessellatus stejnegeri* (auct.; e. g., Smith, 1946, p. 426-428, pl. 120).

\*Type locality "Valley of the Great Salt Lake, Utah".

\*cA—Chicago Academy of Sciences; UINMH—University of Illinois Museum of Natural History; CNHM—Chicago Natural History Museum



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